REMARKS

This response responds to the Office Action dated May 16, 2005 in which the Examiner rejected Claims 1-11 under 35 U.S.C. §103 and stated that Claims 12-22 are allowed.

Claims 1 claims an image processor for detecting a circular pattern, Claim 6 claims a method of image processing to detect a circular pattern and Claim 9 claims a recording medium storing a program. The processor, method and program include a) binarizing input image data to provide bi-level image data, b) counting pixels having a predetermined value in a block of a polygon having n vertices in the bi-level image data, wherein n denotes a natural number equal to or larger than eight and c) deciding, based on a number of the pixels having the predetermined value, whether the circular pattern is detected in the image or not.

Through the structure and method of the claimed invention a) counting pixels having a predetermined value in a block in a polygon having eight or more vertices in a bi-level image data and b) detecting whether a circular pattern is detected based on the number of pixels having a predetermined number, as claimed in Claims 1, 6 and 9, the claimed invention provides an image processor, method and recording medium which can detect a specific pattern at a high speed and at high precision. The prior art does not show, teach or suggest the invention as claimed in Claims 1, 6 and 9.

Claims 1-11 were rejected under 35 U.S.C. §103 as being unpatentable over *Tsuji et al.* (U.S. Patent No. 5,796,869) in view of *Dye* (U.S. Patent No. 5,625,768).

Applicants respectfully traverse the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for

reasons which will be set forth below, Applicants respectfully request the Examiner withdraws the rejections to the claims and allows the claims to issue.

Tsuji et al. appears to disclose a system for recognizing a circular image of a specific color, and the recognizing system includes specific color detecting means for detecting a specific color on an image on an original document (col. 2, lines 37-40). As shown in Fig. 5, a sensor detects a distribution of densities on the diameter of the concentric circles detected by the concentric circle image detecting unit, in the form of ONs and OFFs. The detected density data is compared with the stored data. ON time duration, the number of ONs, ON/OFF pitches or the like may be used for expressing the density data by the sensor. A pattern (pitch and distance) of the chord on the diameter of the concentric circles or a line at a predetermined distance from the center of the circle, and the distances among the intersections of the concentric circles on the chord are stored. When they are coincident with a pattern corresponding to the concentric circles previously stored, it is determined that the detected circular image is the specific concentric circles (col. 5, lines 8-21). Image information on a color original document that is read by a CCD line sensor is converted into digital image signals B, G and R of multitone. The converted image signals are supplied to an image processing system. The image processing system is contained in the circuit board containing section 33. In the image processing system, the received image signals of B, G and R are subjected to various types of processings for improving color, tone, definition, and other image quality and reproduction. These processings are various conversion processings, editorial processings, and others. The color image signals thus processed are converted into image signals of toner colors Y (yellow) M (magenta), C (cyan), K (black or real

black). The toner signals of the process colors are converted into on/off or binarized toner color signals. Then, those toner color signals are output to the image output terminal 34 (col. 6, lines 43-59). When the circular-image detecting circuit 70 and the horizontal pitch signal detecting circuit 71-2 detect pixels, the pixels detected by them are determined to be the pixels at both ends of the diameter of the circle. A circle-center calculating circuit 71-6 calculates the center x_0 (FIG. 8) of the circle. An oblique or vertical pitch signal detecting circuit 71-3 checks as to whether or not the buffer memory 72 stores the circle pixel data corresponding to the positions of the d_0 mm pitch at the circumference when it is turned by a present angle from the fast scan direction, for example, by 45° from the slow scan direction or the fast scan direction. When the circle pixel data is detected also by the oblique pitch signal detecting circuit 71-3, a counter 71-4 counts the number of pixels within the circle. A comparator 71-5 determines whether or not the count value of the counter is equal to the number of pixels previously stored by comparing them. When the number of pixels is within the upper and lower threshold values (th_1 and th_2), the comparator 71-5 determines or recognizes that the detected circle is the set concentric circle. A signal representing the result of this determination is output from a recognition result output circuit 73 (col. 13, lines 19-40).

Thus, *Tsuji et al.* merely discloses detecting concentric circles with a concentric-circle recognizing circuit 71. Nothing in *Tsuji et al.* shows, teaches or suggests counting pixels <u>in a block of a polygon having eight or more vertices in a bi-level image data</u> as claimed in Claims 1, 6 and 9. Rather, *Tsuji et al.* merely discloses detecting concentric circles.

Additionally, *Tsuji et al.* discloses a counter 71-4 which counts the number of pixels within a circle. Nothing *Tsuji et al.* shows, teaches or suggests counting pixels in a block of a polygon (i.e., one portion of a polygon) as claimed in Claims 1, 6 and 9. Rather, *Tsuji et al.* merely discloses counting the number of pixels within the entire circle.

Dye appears to disclose a method and apparatus for minimizing orthogonal errors while interpolating polygons into a pixel grid. (col. 1, lines 16-18) Referring now to FIG. 2, a simplified block diagram of the graphics processor 100 is shown. In general, the graphics processor 100 operates in either a coprocessor or processor mode where the CPU 128 or the graphics processor 100, respectively, controls the system bus 102 for providing data and instructions to the register file 500 within the graphics processor 100 for execution. The polyengine 202 is designed to calculate pixel position, color intensity, depth and transparency or alpha-blending for the purpose of filling multiple-sided, coplanar randomly oriented polygon surfaces. Based upon the vertex points of the polygon to be rendered, the software driver calculates fundamental geometric parameters, including initial and incremental parameters for pixel position, count values, intensity, depth and transparency. These parameters and the corresponding instructions are then loaded into the register file 500, the polyengine 202 begins drawing orthogonal span lines in the frame buffer 110 to fill in the polygon. The interpolation process continues until the entire polygon has been filled in and drawn. (col. 8, lines 50-67) FIGS. 6A-6H are schematic diagrams showing various portions of the interpolator 502 of the polyengine 202. Referring now to FIG. 6A, a schematic diagram of the interpolator for the x parameter is shown. When drawing and filling polygons, this portion of the

interpolator provides the x address of the initial pixel along the main slope of the polygon. (col. 18, lines 1-5) Referring now to FIG. 6B, a schematic diagram of the interpolator for the y parameter is shown. When drawing and filling polygons, this portion of the interpolator provides the y address of the initial pixel along the main slope of the polygon. (col. 19, lines 19-23) Referring now to FIG. 6C, a schematic diagram of the main slope interpolator for the depth or z parameter is shown. When drawing and filling polygons, this portion of the interpolator provides the depth value of each initial pixel along the main slope of the polygon being drawn, where the depth values are stored in the Z-buffer 122. (col. 20, lines 1-7) Referring now to FIG. 6D, a schematic diagram of the main slope interpolator for the color intensity parameter is shown. When drawing and filling polygons, this portion of the interpolator provides the intensity value of each initial pixel along the main slope of the polygon being drawn. (col. 20, lines 38-43) Referring now to FIG. 6E, a schematic diagram of the interpolator for the width parameter is shown. One input of the MUX 658 receives the DATA[23:0] signals and its other input is connected to the output of the WO register 654. The output of the MUX 658 is connected to one input of a two-input, 24-bit MUX 664, which provides its output to the input of a 24-bit register WMAIN 666. The output of the WMAIN register 666 is provided to one input of a 24-bit adder 662, which has its other input connected to the output of the MUX 656. The output of the adder 662 is connected to the other input of the MUX 664. The MLOAD signal is provided to the select input of the MUX 664 and the WMAIN register 666 receives a signal WMSEL at its clock input. The upper 11 bits [22:12] at the output of the WMAIN register 666 are connected through a tap 668 to provide signals XWIDTH[10:0], which define the width of the polygon at each orthogonal

scan line. Again, the XWIDTH[10:0] signals define a count value for each orthogonal span line to determine the number of pixels per scan line. (col. 21, lines 23-40)

Thus, *Dye* merely discloses how to draw three dimensional objects to have the correct color, shading, texture mapping and blending. Nothing in *Dye* shows, teaches or suggests determining whether a circular pattern is detected in an image or not as claimed in claims 1, 6 and 9. Rather, *Dye* is merely directed to correctly drawing three dimensional images.

Additionally, *Dye* merely discloses a polyengine 202 which is designed to calculate pixel position including initial and incremental parameters which are loaded into a register file 500 in order to draw and fill in the polygon. (col. 8, lines 62-67) Nothing in *Dye* shows, teaches or suggests counting pixels in a block of a polygon and then determining whether a circular pattern is detected based on the number of pixels having the predetermined number as claimed in claims 1, 6 and 9. Rather, *Dye* merely discloses calculating pixel position including initial and incremental parameters in order to fill in and draw the polygon. Thus in fact *Dye* is the opposite of the claimed invention.

Finally, *Dye* merely discloses defining a count value for each line to determine the number of pixels per scan line. (col. 21, lines 38-40) Nothing in *Dye* shows, teaches or suggests determining a circular pattern based upon a number of pixels having a predetermined number as claimed in claims 1, 6 and 9.

The combination of *Tsuji et al.* and *Dye* would not be possible since *Tsuji et al.* is directed to a system for recognizing a circular image in an original document while *Dye* is directed to drawing a three-dimensional image. Applicants respectfully submit that a person of ordinary skill in the art would not be able to combine the

references as suggested by the Examiner. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 1, 6 and 9 under 35 U.S.C. §103.

Claims 2-5, 7-8 and 10-11 depend from Claims 1, 6 and 9 and recite additional features. Applicants respectfully submit that Claims 2-5, 7-8 and 10-11 would not have been obvious within the meaning of 35 U.S.C. §103 over *Tsuji et al.* and *Dye* at least for the reasons as set forth above. Applicants respectfully request the Examiner withdraws the rejection to Claims 2-5, 7-8 and 10-11 under 35 U.S.C. §103.

The prior art of record, which is not relied upon, is acknowledged. The references taken singularly or in combination do not anticipate or make obvious the claimed invention.

Thus, it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested to contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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